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Application :	10/049,509	**Examiner :**	McCall	**GAU :**	2855
From:	KEM	**Location:**	(IDC) FMF FDC	**Date:**	12/8/05

Tracking #: epm 10/049,509 Week Date: 8/29/05

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☐ 1449		☐ Continuing Data
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☐ IIFW		☐ Fees
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☐ DRW		
☐ OATH		
☐ 312		
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[RUSH] MESSAGE:

(1.) Most recent claim set is illegible. Please resolve.

Thank you

Kem

[XRUSH] RESPONSE:

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INITIALS:

NOTE: This form will be included as part of the official USPTO record, with the Response document coded as XRUSH.

REV 10/04

Sughrue
SUGHRUE MION, PLLC

2100 Pennsylvania Avenue, NW
Washington, DC 20037-3213
T 202.293.7060
F 202.293.7860

www.sughrue.com

FAX

Date	January 19, 2006		
To	Publishing Division		
Of	U.S. Patent and Trademark Office		
Fax	703-308-6642		
From	Nataliya Dvorson *Reg. No. 56,616*		
Subject	RESPONSE TO NOTICE TO FILE CORRECTED APPLICATION PAPERS		
Our Ref	Q68269	Appln No	10/049,509
Conf No	4003	Inventors	Hidetoshi YOKOTA, et al.
Pages	**26** (including cover sheet)		

Please call attention to problems with this transmission by return fax or telephone. Thank you.

This fax filing includes:
1. This cover sheet {one page}
2. Response To Notice To File Corrected Application Papers
   (with claims section of Amendment under 37 C.F.R. § 1.111 filed June 15, 2005) {12 pages}
3. Copy of Notice to File Corrected Application Papers {13 pages}

CERTIFICATION OF FACSIMILE TRANSMISSION

Sir:

I hereby certify that the above identified correspondence is being facsimile transmitted to the Publishing Division of the USPTO on January 19, 2006 at facsimile no. 703-308-6642.

Respectfully submitted,

Nataliya Dvorson

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Hidetoshi YOKOTA, et al.

Docket No: Q68269

Appln. No.: 10/049,509

Group Art Unit: 2855

Confirmation No.: 4003

Examiner: Eric S. McCALL

Filed: June 07, 2002

For: METHOD FOR ESTIMATING VEHICULAR RUNNING STATE, VEHICULAR RUNNING STATE ESTIMATING DEVICE, VEHICLE CONTROL DEVICE, AND TIRE WHEEL

RESPONSE TO NOTICE TO FILE CORRECTED APPLICATION PAPERS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the "Notice to File Corrected Application Papers-Notice of Allowance Mailed", mailed December 22, 2005, submitted herewith is a legible copy of the claims section of the Amendment filed on June 15, 2005. Applicant is only enclosing the pages of the Amendment which include the claims section as required by the Notice. Also, attached is a copy of the "Notice to File Corrected Application Papers - Notice of Allowance Mailed".

Consideration of the attached is respectfully requested.

No fee is believed to be necessary; however, if the USPTO disagrees, the USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880.

Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

Nataliya Dvorson
Registration No. 56,616

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: January 19, 2006

Certificate of transmission

I hereby certify that this correspondence is being facsimile transmitted to the Publishing Division of the USPTO at Fax No. 703-308-6642 on January 19, 2006.

Nataliya Dvorson
Registration No. 56,616

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 10/049,509

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (canceled).

2. (previously presented): A vehicle running state estimation method comprising:

detecting a vibration level of a portion below a spring of a running vehicle; and

estimating the running state of the vehicle by determining at least one of a condition of a road surface on which the vehicle is running and a running state of each tire,

wherein said determining is based on the detected vibration level, and wherein a waveform of time changes in the vibration level is detected and the condition of the road surface on which the vehicle is running is estimated from a vibration level at a predetermined position of the waveform or for a predetermined time range.

3. (currently amended): ~~The~~ A vehicle running state estimation method ~~according to claim 1,~~ comprising:

detecting a vibration level of a portion below a spring of a running vehicle; ~~wherein~~ a frequency of the detected vibration level is analyzed to calculate a vibration level at a predetermined frequency band and a ~~the degree of slipperiness~~ condition of the road surface on which the vehicle is running is estimated ~~from~~ by comparing the calculated vibration level with a

master curve which is a vibration level detected through running on a road having a predetermined condition of a road surface of the running vehicle.

4. (currently amended): ~~The~~ A vehicle running state estimation method ~~according to claim 1,~~ comprising:

detecting a vibration level of a portion below a spring of a running vehicle; and

estimating the running state of the vehicle by determining a degree of slipperiness of a road surface on which the vehicle is running and a running state of each tire,

wherein said determining is based on the detected vibration level, and

wherein the frequency of the detected vibration level is analyzed, at least two vibration levels at different frequency bands are calculated, an operation is carried out on the at least two calculated vibration levels, and the degree of slipperiness of the road surface is estimated from computed value.

5. (currently amended): ~~The~~ A vehicle running state estimation method comprising:

detecting a vibration level of a portion below a spring of a running vehicle; and

estimating the running state of the vehicle by determining a condition of a road surface on which the vehicle is running and a running state of each tire,

wherein said determining is based on the detected vibration level, and ~~according to claim 1,~~

wherein vibration levels of at least two points of a portion below the spring with a buffer member interposed therebetween are detected to calculate a vibration transmission level of the portion below the spring between the two points at a predetermined frequency band; and the ~~degree of slipperiness~~ condition of the road surface is estimated from the calculated vibration transmission level.

6. (previously presented): A vehicle running state estimation apparatus for estimating running state of a vehicle based on road surface conditions, the estimation apparatus comprising:

means of detecting a vibration level of a portion below a spring of a running vehicle;

means of computing waveform of time changes in the vibration level; and

road surface condition estimation means for estimating a condition of a road surface on which the vehicle is running from the vibration level at a predetermined position of the waveform or for a predetermined time range.

7. (previously presented): The vehicle running state estimation apparatus according to claim 6 further comprising means of calculating the vibration level of at least one of a tire leading edge portion, tire ground contact portion and tire trailing edge portion of the waveform.

8. (currently amended): A vehicle running state estimation apparatus comprising:

means of detecting a vibration level of a portion below a spring of a running vehicle;

means of calculating a vibration level at a predetermined frequency band by analyzing frequency of the detected vibration level; and

road surface condition estimation means for estimating a ~~degree of slipperiness~~ condition of the road surface on which the vehicle is running ~~from~~ by comparing the calculated vibration level with the master curve which is the vibration level detected through running on a road having a predetermined road surface condition,

wherein the running state of the vehicle is estimated based on the ~~degree of slipperiness~~ condition of the road surface ~~received~~ from the road surface condition estimation means.

9. (previously presented): A vehicle running state estimation apparatus comprising:

means of detecting a vibration level of a portion below a spring of a running vehicle; and

road surface condition estimation means for estimating a degree of slipperiness of a road surface from a value obtained by carrying out an operation on at least two vibration levels at different frequency bands by analyzing the frequency of the detected vibration level,

wherein the running state of the vehicle is estimated based on the degree of slipperiness of the road surface received from the road surface condition estimation means.

10. (currently amended): A vehicle running state estimation apparatus for estimating a running state of a vehicle based on a condition of a road surface comprising:

means of detecting vibration levels of at least two points on a portion below a spring of the running vehicle with a buffer member being interposed therebetween;

means of calculating a vibration transmission level at a predetermined frequency band between said at least two vibration detection points; and

road surface condition estimation means for estimating a ~~degree of slipperiness~~ condition of the road surface on which the vehicle is running from the calculated vibration transmission level.

11. (canceled).

12. (currently amended): ~~The~~ A vehicle running state estimation apparatus ~~according to claim 8,~~ comprising:

means of detecting a vibration level of a portion below a spring of a running vehicle;

means of calculating a vibration level at a predetermined frequency band by analyzing frequency of the detected vibration level; and

road surface condition estimation means for estimating a degree of slipperiness of the road surface on which the vehicle is running from the calculated vibration level,

wherein the running state of the vehicle is estimated based on the degree of slipperiness of the road surface received from the road surface condition estimation means, and

wherein a road surface friction coefficient μ at a time of running the vehicle is estimated based on a relationship between a surface friction coefficient μ obtained from braking distances of the vehicle under various road conditions at different speeds and at least one of the calculated

vibration level at said predetermined frequency band and a calculated vibration transmission level .

13. (currently amended): ~~The~~ A vehicle running state estimation apparatus ~~according to claim 8,~~ comprising;

means of detecting a vibration level of a portion below a spring of a running vehicle;

means of calculating a vibration level at a predetermined frequency band by analyzing frequency of the detected vibration level; and

road surface condition estimation means for estimating a degree of slipperiness of the road surface on which the vehicle is running from the calculated vibration level,

wherein the running state of the vehicle is estimated based on the degree of slipperiness of the road surface received from the road surface condition estimation means, and

wherein the frequency band is a band including frequency of natural vibration of a tire tread land portion.

14. (currently amended): ~~The~~ A vehicle running state estimation apparatus ~~according to claim 8,~~ comprising:

means of detecting a vibration level of a portion below a spring of a running vehicle;

means of calculating a vibration level at a predetermined frequency band by analyzing frequency of the detected vibration level; and

road surface condition estimation means for estimating a degree of slipperiness of the road surface on which the vehicle is running from the calculated vibration level,

wherein the running state of the vehicle is estimated based on the degree of slipperiness of the road surface received from the road surface condition estimation means, and

wherein a threshold value is set for the vibration level, and the surface of the road is estimated to be in a low friction condition when the calculated vibration level exceeds the threshold value.

15. (previously presented): The vehicle running state estimation apparatus according to claim 14, wherein the threshold value can be changed.

16. (previously presented): The vehicle running state estimation apparatus according to claim 6 which further comprises a vehicle speed detection means to estimate the condition of a road surface based on vehicle speed.

17. (previously presented): The vehicle running state estimation apparatus of claim 6, further comprising:

means of judging slipperiness of the road surface based on the condition of the road surface estimated by the road surface condition estimation means; and

warning means for giving a warning when it is judged that the condition of the road surface is slippery.

18. (previously presented): The vehicle running state estimation apparatus according to claim 17, further comprising:

vehicle speed detection means to change decision on the slipperiness of the road surface and warning level based on vehicle speed.

19. - 24. (canceled).

25. (previously presented): The vehicle running state estimation apparatus according to claim 6, further comprising a transmitter for transmitting output of the vibration detection means for calculating a time change in the vibration level or a vibration level at a predetermined frequency band.

26. (previously presented): The vehicle running state estimation apparatus according to claim 6 further comprising a power generating unit mounted on a tire wheel, wherein the power generating unit generates power by rolling of each tire and supplies power for at least one of driving the vibration detection means and amplifying output of the vibration detection means.

27. (previously presented): A vehicle control apparatus comprising vehicle control means for controlling the running state of a vehicle based on the condition of the road surface estimated by the vehicle running state estimation apparatus of claim 6.

28. (previously presented): The vehicle control apparatus according to claim 27 which comprises vehicle speed detection means to control the running state of the vehicle based on vehicle speed.

29. (previously presented): The vehicle control apparatus according to claim 27, wherein the vehicle control means controls locked state of each wheel.

30. (previously presented): The vehicle control apparatus according to claim 27, wherein the vehicle control means controls attitude of the vehicle.

31. (previously presented): The vehicle control apparatus according to claim 27, wherein the vehicle control means controls air pressure of each tire.

32. (previously presented): The vehicle control apparatus according to claim 27, wherein the vehicle control means controls idling state of each wheel.

33. (previously presented): The vehicle control apparatus according to claim 27, wherein the vehicle control means changes inter-vehicle distance set value of an automatic driving system.

34. (previously presented): A tire wheel comprising: the vehicle running state estimation apparatus for estimating a running state of the vehicle by detecting the vibration level of the portion below the spring as set forth in claim 6, and a power generating unit for generating power by a rolling of each tire and supplying power to the estimation apparatus.

35. (original): The tire wheel according to claim 34, wherein the vehicle running state estimation apparatus is mounted to the tire wheel.

36. (previously presented): The tire wheel according to claim 34, wherein the power generating unit comprises a rotor magnetized and rotated by the rolling of each tire, a stator made from a high magnetic permeability material and adjacent to the rotor and a power generating coil installed within a magnetic circuit including the rotor and the stator.

37. (original): The tire wheel according to claim 36, wherein the power generating unit comprises means of accumulating electromotive force generated in the power generating coil.

38. (previously presented): The tire wheel according to claim 36, wherein the rotor is turned by rotating an unbalance weight the gravity center of the rotary cone of which is eccentric to a rotary shaft by the rolling of each tire.

39. (previously presented): The tire wheel according to claim 36, wherein an air stream generated by the rolling of each tire is introduced into the power generating unit and the rotor is turned by the introduced air stream.

40. (new): The vehicle running state estimation method according to claim 3, wherein the master curve is prepared based on the vibration level detected at the time when the vehicle is running on a surface of a road with a usual dry asphalt pavement.

41. (new): The vehicle state estimation apparatus according to claim 8, wherein the master curve is prepared based on the vibration level detected through the running on the surface of a usual road with dry asphalt pavement.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/049,509	06/07/2002	Hidetoshi Yokota	Q68269	4004

23373 7590 12/22/2005

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
MCCALL, ERIC SCOTT	

ART UNIT	PAPER NUMBER
2855	

DATE MAILED: 12/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

UNITED STATES PATENT AND TRADEMARK OFFICE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Serial Number
10049509

Date Mailed
12/22/05

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Notice of Allowance Mailed

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

Applicant is given 30 days from the mail date of this Notice within which to correct the informalities indicated below. A failure to reply will result in the application being ABANDONED. This period for reply is NOT extendable under 37 CFR 1.136 (a) or (b).

- Amended claims faxed 6/15/2005 is illegible. Fax missing information to number below or e-mail.

  - For status updates visit http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR System, contact the Electronic Business Center (EBC) toll free at 866-217-9197.

APPLICANT MUST SUPPLY MISSING INFORMATION WITHIN 30 DAYS OF THE MAIL DATE OF THIS NOTICE.

A copy of this notice MUST be returned with the reply. Please address response to Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450

Rori Burch
USPTO
Publishing Division
Rori.burch@uspto.gov
Fax (703) 746-6830
Fax (703) 308-6642
703-305-0333 ext.135 (V)

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 10/049,509

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (canceled).

2. (previously presented): A vehicle running state estimation method comprising:

detecting a vibration level of a portion below a spring of a running vehicle; and

estimating the running state of the vehicle by determining at least one of a condition of a road surface on which the vehicle is running and a running state of each tire,

wherein said determining is based on the detected vibration level, and wherein a waveform of time changes in the vibration level is detected and the condition of the road surface on which the vehicle is running is estimated from a vibration level at a predetermined position of the waveform or for a predetermined time range.

3. (currently amended): ~~The~~ A vehicle running state estimation method ~~according~~ to claim ~~1,~~ comprising:

detecting a vibration level of a portion below a spring of a running vehicle; ~~wherein~~ a frequency of the detected vibration level is analyzed to calculate a vibration level at a predetermined frequency band and a ~~the degree of slipperiness~~ condition of the road surface on which the vehicle is running is estimated ~~from~~ by comparing the calculated vibration level with a

master curve which is a vibration level detected through running on a road having a predetermined condition of a road surface of the running vehicle.

4. (currently amended): ~~The~~ A vehicle running state estimation method ~~according to~~ claim ~~1~~, comprising:

detecting a vibration level of a portion below a spring of a running vehicle; and

estimating the running state of the vehicle by determining a degree of slipperiness of a road surface on which the vehicle is running and a running state of each tire,

wherein said determining is based on the detected vibration level, and

wherein the frequency of the detected vibration level is analyzed, at least two vibration levels at different frequency bands are calculated, an operation is carried out on the at least two calculated vibration levels, and the degree of slipperiness of the road surface is estimated from computed value.

5. (currently amended): ~~The~~ A vehicle running state estimation method comprising:

detecting a vibration level of a portion below a spring of a running vehicle; and

estimating the running state of the vehicle by determining a condition of a road surface on which the vehicle is running and a running state of each tire,

wherein said determining is based on the detected vibration level, and ~~according to~~ claim ~~1~~.

wherein vibration levels of at least two points of a portion below the spring with a buffer member interposed therebetween are detected to calculate a vibration transmission level of the portion below the spring between the two points at a predetermined frequency band, and the degree of slipperiness condition of the road surface is estimated from the calculated vibration transmission level.

6. (previously presented): A vehicle running state estimation apparatus for estimating running state of a vehicle based on road surface conditions, the estimation apparatus comprising:

means of detecting a vibration level of a portion below a spring of a running vehicle;

means of computing waveform of time changes in the vibration level; and

road surface condition estimation means for estimating a condition of a road surface on which the vehicle is running from the vibration level at a predetermined position of the waveform or for a predetermined time range.

7. (previously presented): The vehicle running state estimation apparatus according to claim 6 further comprising means of calculating the vibration level of at least one of a tire leading edge portion, tire ground contact portion and tire trailing edge portion of the waveform.

8. (currently amended): A vehicle running state estimation apparatus comprising:

means of detecting a vibration level of a portion below a spring of a running vehicle;

means of calculating a vibration level at a predetermined frequency band by analyzing frequency of the detected vibration level; and

road surface condition estimation means for estimating a ~~degree of slipperiness~~ condition of the road surface on which the vehicle is running ~~from~~ by comparing the calculated vibration level with the master curve which is the vibration level detected through running on a road having a predetermined road surface condition,

wherein the running state of the vehicle is estimated based on the ~~degree of slipperiness~~ condition of the road surface received from the road surface condition estimation means.

9. (previously presented): A vehicle running state estimation apparatus comprising:

means of detecting a vibration level of a portion below a spring of a running vehicle; and

road surface condition estimation means for estimating a degree of slipperiness of a road surface from a value obtained by carrying out an operation on at least two vibration levels at different frequency bands by analyzing the frequency of the detected vibration level,

wherein the running state of the vehicle is estimated based on the degree of slipperiness of the road surface received from the road surface condition estimation means.

10. (currently amended): A vehicle running state estimation apparatus for estimating a running state of a vehicle based on a condition of a road surface comprising:

means of detecting vibration levels of at least two points on a portion below a spring of the running vehicle with a buffer member being interposed therebetween;

means of calculating a vibration transmission level at a predetermined frequency b nd between said at least two vibration detection points; and

road surface condition estimation means for estimating a ~~degree of slipperiness~~ con dition of the road surface on which the vehicle is running from the calculated vibration transmiss ion level.

11. (canceled).

12. (currently amended): ~~The~~ A vehicle running state estimation apparatus ~~accord ng to~~ claim ~~8~~, comprising:

means of detecting a vibration level of a portion below a spring of a running vehicl e;

means of calculating a vibration level at a predetermined frequency band by analyz ng frequency of the detected vibration level; and

road surface condition estimation means for estimating a degree of slipperiness of t he road surface on which the vehicle is running from the calculated vib ration level,

wherein the running state of the vehicle is estimated based on the degree of slipperi ness of the road surface received from the road surface condition estimation means, and

wherein a road surface friction coefficient μ at a time of running the vehicle is estin ated based on a relationship between a surface friction coefficient μ obta ned from braking dista nces of the vehicle under various road conditions at different speeds and a least one of the calc lated

vibration level at said predetermined frequency band and a calculated vibration transmission level.

13. (currently amended): ~~The~~ A vehicle running state estimation apparatus according to ~~claim 8~~ comprising:

means of detecting a vibration level of a portion below a spring of a running vehicle;

means of calculating a vibration level at a predetermined frequency band by analyzing frequency of the detected vibration level; and

road surface condition estimation means for estimating a degree of slipperiness of the road surface on which the vehicle is running from the calculated vibration level,

wherein the running state of the vehicle is estimated based on the degree of slipperiness of the road surface received from the road surface condition estimation means, and

wherein the frequency band is a band including frequency of natural vibration of a tire tread land portion.

14. (currently amended): ~~The~~ A vehicle running state estimation apparatus according to ~~claim 8~~ comprising:

means of detecting a vibration level of a portion below a spring of a running vehicle;

means of calculating a vibration level at a predetermined frequency band by analyzing frequency of the detected vibration level; and

road surface condition estimation means for estimating a degree of slipperiness of the road surface on which the vehicle is running from the calculated vibration level,

wherein the running state of the vehicle is estimated based on the degree of slipperiness of the road surface received from the road surface condition estimation means, and

wherein a threshold value is set for the vibration level, and the surface of the road is estimated to be in a low friction condition when the calculated vibration level exceeds the threshold value.

15. (previously presented): The vehicle running state estimation apparatus according to claim 14, wherein the threshold value can be changed.

16. (previously presented): The vehicle running state estimation apparatus according to claim 6 which further comprises a vehicle speed detection means to estimate the condition of a road surface based on vehicle speed.

17. (previously presented): The vehicle running state estimation apparatus of claim 6, further comprising:

means of judging slipperiness of the road surface based on the condition of the road surface estimated by the road surface condition estimation means; and

warning means for giving a warning when it is judged that the condition of the road surface is slippery.

18. (previously presented): The vehicle running state estimation apparatus according to claim 17, further comprising:

vehicle speed detection means to change decision on the slipperiness of the road surface and warning level based on vehicle speed.

19. - 24. (canceled).

25. (previously presented): The vehicle running state estimation apparatus according to claim 6, further comprising a transmitter for transmitting output of the vibration detection means for calculating a time change in the vibration level or a vibration level at a predetermined frequency band.

26. (previously presented): The vehicle running state estimation apparatus according to claim 6 further comprising a power generating unit mounted on a tire wheel, wherein the power generating unit generates power by rolling of each tire and supplies power for at least one of driving the vibration detection means and amplifying output of the vibration detection means.

27. (previously presented): A vehicle control apparatus comprising vehicle control means for controlling the running state of a vehicle based on the condition of the road surface estimated by the vehicle running state estimation apparatus of claim 6.

28. (previously presented): The vehicle control apparatus according to claim 27 which comprises vehicle speed detection means to control the running state of the vehicle based on vehicle speed.

29. (previously presented): The vehicle control apparatus according to claim 27, wherein the vehicle control means controls locked state of each wheel.

30. (previously presented): The vehicle control apparatus according to claim 27, wherein the vehicle control means controls attitude of the vehicle.

31. (previously presented): The vehicle control apparatus according to claim 27, wherein the vehicle control means controls air pressure of each tire.

32. (previously presented): The vehicle control apparatus according to claim 27, wherein the vehicle control means controls idling state of each wheel.

33. (previously presented): The vehicle control apparatus according to claim 27, wherein the vehicle control means changes inter-vehicle distance set value of an automatic driving system.

34. (previously presented): A tire wheel comprising: the vehicle running state estimation apparatus for estimating a running state of the vehicle by detecting the vibration level of the portion below the spring as set forth in claim 6, and a power generating unit for generating power by a rolling of each tire and supplying power to the estimation apparatus.

35. (original): The tire wheel according to claim 34, wherein the vehicle running state estimation apparatus is mounted to the tire wheel.

36. (previously presented): The tire wheel according to claim 34, wherein the power generating unit comprises a rotor magnetized and rotated by the rolling of each tire, a stator made from a high magnetic permeability material and adjacent to the rotor and a power generating coil installed within a magnetic circuit including the rotor and the stator.

37. (original): The tire wheel according to claim 36, wherein the power generating unit comprises means of accumulating electromotive force generated in the power generating coil.

38. (previously presented): The tire wheel according to claim 36, wherein the rotor is turned by rotating an unbalance weight the gravity center of the rotary cone of which is eccentric to a rotary shaft by the rolling of each tire.

39. (previously presented): The tire wheel according to claim 36, wherein an air stream generated by the rolling of each tire is introduced into the power generating unit and the rotor is turned by the introduced air stream.

40. (new): The vehicle running state estimation method according to claim 3, wherein the master curve is prepared based on the vibration level detected at the time when the vehicle is running on a surface of a road with a usual dry asphalt pavement.

41. (new): The vehicle state estimation apparatus according to claim 8, wherein the master curve is prepared based on the vibration level detected through the running on the surface of a usual road with dry asphalt pavement.